

What we claim and desire to secure by Letters Patent is:

1. A method for recording a bar code which consists of a plurality of parallel lines of varying thickness, characterized by the steps of

a) capturing, by means of a reading device, a sequence of two-dimensional images of the bar code during moving of the reading device across the same;

b) detecting edges of the bar code in at least a subset of the images;

c) determining, for the edges of at least a subset of the detected images, possible displacements in relation to the edges of a preceding image;

d) determining the most probable sequence of displacements for the sequence of images; and

e) reconstructing the bar code by means of said sequence of images and said most probable sequence of displacements.

2. A method for recording a bar code as claimed in claim 1, in which in said step b) the edges are detected starting from the darkness level in pixels in a band over the image, said band being essentially perpendicular to the direction of extension of the lines of the bar code.

(continued claim 3)

b1) generating, for at least a subset of the images which represent parts of the bar code, a histogram corresponding to the darkness level in said pixels along said band; and

b2) differentiating said histogram so that a sequence of edge coordinates is provided, which describe where along said band in the image the edges of the lines of the bar code are located.

4. A method for recording a bar code as claimed in claim 3, in which differentiated histograms are generated for a plurality of bands extending over an image at different angles, and in which the band whose differentiated histograms have the highest peaks is selected as the band which is essentially perpendicular to the direction of extension of the lines of the bar code.

5. A method for recording a bar code as claimed in claim 4, in which differentiated histograms are generated for more bands in the first image of the image sequence than in subsequent images.

6. A method for recording a bar code as claimed in any one of claims 3, 4 or 5, in which an edge coordinate is determined more accurately by maximizing an approximating function running through the points which form the

boundary of the bar code lines in the image.

(continued claim 7)

possible displacements are determined by assuming such a displacement that two edge coordinates correspond to each other and determining whether the remaining edge coordinates correspond to each other.

8. A method for recording a bar code as claimed in any one of the preceding claims, in which in step d) said most probable sequence of displacements is determined with a criterion based on low acceleration of the reading device.

9. A method for recording a bar code as claimed in any one of the preceding claims, in which in step d) for the images in which edges have been detected, error functions are determined for at least a subset of the conceivable displacements relative to displacements of a preceding image.

10. A method for recording a bar code as claimed in claim 9, in which said error function e_k is calculated as

$$e_k = \max[e_{k-1}, |v_k - v_{k-1}|, |a_k - a_{k-1}|]$$

wherein

e_{k-1} = error function of the displacement of a preceding image,

v_{k-1} = speed of the reading device when the preceding image was captured if the displacement of the preced-

(continued claim 10)

v_k = speed of the reading device when the image in question was captured if the displacement of the image in question is valid,

a_{k-1} = acceleration of the reading device when the preceding image was captured if the displacement of the preceding image is valid,

a_k = acceleration of the reading device when the image in question was captured if the displacement of the image in question is valid.

11. A method for recording a bar code as claimed in claim 9 or 10, in which for the last image in the image sequence the displacement relative to displacements of the preceding image, which has the lowest error function, is selected as the most probable displacement.

12. A method for recording a bar code as claimed in claim 11, in which for each image preceding the last image, the displacement with regard to the most probable displacement of the subsequent image, which has the lowest error function, is selected as the most probable displacement.

13. A reading device for recording a bar code, which consists of a plurality of parallel lines of varying thickness, which are arranged in that the

reading device is adapted to read the bar code in a direction

(continued claim 13)

edges of the bar code in at least a subset of the images, means for determining possible displacements in relation to the edges of a preceding image for the edges of at least a subset of the detected images, means for determining the most probable sequence of displacements for the sequence of images, and means for reconstructing the bar code by means of said sequence of images and said most probable sequence of displacements.

14. A reading device for recording a bar code as claimed in claim 13, in which the reading device is included in a reading pen.

15. A reading device for recording a bar code as claimed in claim 13, in which the reading device is integrated in a mobile telephone.

16. A digital storage medium comprising a computer program for recording a bar code, which consists of a plurality of parallel lines of varying thickness, characterized in that the program comprises instructions for the steps of

a) capturing by means of a reading device a sequence of two-dimensional images of the bar code when moving the reading device across the same;

b) detecting the edges of the bar code in at least a

(continued claim 16)

c) determining possible displacements in relation to the edges of a preceding image for the edges of at least a subset of the detected images;

d) determining the most probable sequence of displacements for the sequence of images; and

e) reconstructing the bar code by means of said sequence of images and said most probable sequence of displacements.

17. A method for recording a bar code, c h a r - a c t e r i z e d by the steps of

- capturing by means of a reading device a sequence of two-dimensional images of the bar code when moving the reading device across the same;

- determining for at least a subset of the images possible displacements in relation to a preceding image;

- determining the probable sequence of displacements for the sequence of images; and

- reconstructing the bar code by means of said sequence of images and said most probable sequence of displacements.